SECTION 07 42 13

METAL PLATE WALL PANELS

PART 1: GENERAL

1.01 SCOPE

A. Section Includes
   1. Metal Plate Wall Panels.
   2. Panel systems requirements of aluminum plate panels including exterior and interior installation assemblies, components, and accessories.

B. Related Sections: Section(s) related to this section include:
   1. Division 05 Metal Framing Sections
   2. Division 07 Air and Vapor Barrier
   3. Division 07 Flashing and Trim Sections
   4. Division 07 Joint Treatment Section
   5. Division 08 Aluminum Windows Section
   6. Division 08 Glass and Glazing Section
   7. Division 08 Curtain Wall Sections

1.02 QUALITY ASSURANCE

A. General: Standards listed by reference, including revisions by issuing authority, form a part of this specification section to the extent indicated. Standards listed have either been identified by the International Building Code (IBC), local building code, or specific requirement for this building construction type.

B. Aluminum Association (AA)
   1. Aluminum Design Manual
   2. AA-MI2C22A41: Anodized - Clear Coating
   3. AA-MI2C22A44: Anodized - Color Coating

C. American Society for Testing and Materials (ASTM) International
   1. ASTM B209-10 Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
   2. ASTM E283 Test Method for Determining Rate of Airflow through Exterior Windows, Curtain Walls and Doors under Specified Pressure Differences Across the Specimen.
   3. ASTM E330 Standard Test Method for Water Penetration of Exterior Windows, Curtain Wall, and Doors by Uniform Static Air Pressure Difference.
   4. ASTM E331 Standard Test Method for Water Penetration of Exterior Windows, Curtain Wall, and Doors by Uniform Static Air Pressure Difference.

D. American Architectural Manufacturers Associations (AAMA)
   1. AAMA 2605 Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels.
   2. AAMA 509 Voluntary Test and Classification Method of Drained and Back Ventilated Rain Screen Wall Cladding Systems.
   3. AAMA 611-14 Voluntary Specification for Anodized Architectural Aluminum.

1.03 SYSTEM DESCRIPTION

A. Performance Requirements:
   1. Provide installed metal plate panel system designed to withstand specified loads while maintaining allowable deflection and thermal movement performance as defined by the Manufacturer.

B. Deflection and Thermal Movement: Provide installed metal plate panel systems that have been designed to resist to wind loading, acting inward and outward.

1. Perimeter Framing Deflection: Deflection of panel perimeter framing member shall not exceed L/175 normal to plane of the wall where L is the unsupported span of the perimeter framing member.
2. Panel Deflection: Deflection of the panel face shall not exceed L/60 at design load where L is the unsupported span of the panel.
3. Anchor Deflection: At connection points of framing members to anchors, anchor deflection in any direction shall not exceed 0.0625in (1.6mm).
4. Thermal Movements: Allow for free and noiseless horizontal and vertical thermal movement due to expansion and contraction of component parts over a temperature range of -20°F (-29°C) to +180°F (82.2°C) at the material surface.
    a. Buckling,opening of joints, undue stress on fasteners, failure of sealants, or any other detrimental effects of thermal movement will not be permitted.
    b. Fabrication, assembly and erection procedures shall take into account the ambient temperature range at the time of the respective operation.

C. System Requirements
1. Structural: Provide systems that have been tested in accordance with ASTM E330 at a design pressure of [specify design pressure in psf (kPa)] and have been certified to be without permanent deformation or failures of structural members.
2. Drained and Back Ventilated Rainscreen System
    a. Tested to AAMA 5209 Standard
        1) ASTM E283 Air Leakage: The air flow measurement across the metal plate panel rainscreen system (excluding jamb conditions) is measured to determine the V-axis classification on chart Ib from AAMA 509.
        2) ASTM E331 and AAMA 501.1 - Water Infiltration Measurement: At pressures of 6.24psf (300Pa) and 12.0psf (575Pa) for ASTM E331 and AAMA 501.1, the average water from the four (4) tests is collected, measured, and averaged to determine the W-axis classification.
            a) The system will be classified when the V-axis classification number is greater than or equal to the W-axis, classification number as presented on the AAMA 509 Chart Ia or Ib. (i.e. V2/W2 is acceptable, V1/W2 is not acceptable)
        3) ASTM E330: The metal plate panel rainscreen system should be engineered to meet the project design loads. The metal plate panel system must meet or exceed the following criteria when tested to a minimum pressure of 30.0psf (1436Pa) with system joinery closed (taped or sealed) in order to produce prescribed static loads of the test.
            a) Deflections should not exceed limitations defined within the section on Deflection and Thermal Movement.
3. Pressure Equalized Rainscreen System
    a. Tested to AAMA 508
        1) AAMA 508 (modified ASTM E1233) Pressure Cycle Testing must yield results as follows:
            a) The lag between the cavity and the cyclic wind pressure shall not exceed 0.08 seconds.
            b) The maximum differential between the cavity and the cyclic wind pressure shall not exceed 50% that of the maximum test pressure.
        2) ASTM E331 Static Water Penetration: The metal plate panel rainscreen system must be tested under a static pressure at 12.0psf (575Pa) minimum over a 15 minute time period and yield results as follows:
            a) All water that penetrates the exterior rainscreen cladding including condensation must be controlled and drained to the exterior.
            b) Any droplets water that contacts the air/water barrier cannot exceed 5% of the air/water barrier surface.
            c) Water will not produce any continuous stream of water on the air/water barrier.

3) AAMA 501.1 Dynamic Water Infiltration: The metal plate panel rainscreen system must be tested to a wall pressure equivalent 12.0psf (575PA) over a 15 minute time period and yield results as follows:
    a) All water that penetrates the exterior rainscreen cladding including condensation must be controlled and drained to the exterior.
    b) Any droplets water that contacts the air/water barrier cannot exceed 5% of the air/water barrier surface.
    c) Water will not produce any continuous stream of water on the air/water barrier.
4) ASTM E330 The metal plate panel rainscreen system should be engineered to meet the project design loads. The metal plate panel rainscreen system must meet or exceed the following criteria when tested to a minimum pressure of 30.0psf (1436Pa) with system joinery closed (taped or sealed) in order to produce prescribed static loads of the test. The wall air and water barrier should not be submitted to loads during the test.
    a) Deflections do not exceed limitations defined within the section on Deflection and Thermal Movement.

1.04 SUBMITTALS

A. Submit in accordance with Conditions of the Contract and Division 01 Submittal Procedures Section.
B. Submit product data, including manufacturer's brochures and Spec-Data Sheets.
C. Shop Drawings: Submit shop drawings showing project layout and elevations; fastening and anchoring methods; detail and location of joints, sealants, and gaskets, including joints necessary to accommodate thermal movement; trim; flashing; and accessories.
D. Samples: Submit selection and verification samples for finishes, colors, and textures.
    1. Selected Samples: Manufacturer's color charts of chips illustrating full range of colors, finishes and patterns available for composite metals panels with factory applied finishes.
    2. Verification Samples:
        a. Panel System Assembly: Two samples of each assembly 12in x 12in (304mm x 304mm)
        b. Two samples of each color in coil coated, or draw down samples on aluminum substrate, not less than 3in x 4in (76mm x 102mm).
E. Quality Assurance Submittals (Submit the following):
    1. Product Test Reports: Certified test reports showing compliance with specified performance characteristics and physical properties, or a third-party listing documenting compliance to a comparable code section.
    2. Product Certificates: Product certificates signed by manufacturer certifying materials comply with specified performance characteristics and physical requirements.
    3. Product Literature
    4. Metal plate panel rainscreen system fabricator's field reports.
F. Closeout Submittals (Submit the following):
    1. Warranty: Warranty documents specified.

1.05 QUALITY ASSURANCE

A. Metal Plate Panel Rainscreen System Fabricator Qualifications
    1. Metal plate panel rainscreen system fabricator will have at least (3) years of continuous documented experience fabricating either MCM or the solid metal plate panel material type specified.
    2. Metal plate panel rainscreen system fabricator will have been in business under its present name for at least five (5) years prior to the start of this project.
    3. Metal plate panel rainscreen system fabricator will be capable or providing field service representation during construction.
    4. Metal plate panel rainscreen system fabricator will not have filed for protection from creditors under state or federal insolvency or debtor relief statues or codes

B. Metal Plate Panel Rainscreen System Installer Qualifications
   1. Metal plate panel rainscreen system installer will have been in business under its present name for at least five (5) years prior to the start of this project and have experience with similar sized projects in either MCM or solid metal plate.
   2. Metal plate panel rainscreen system installer will be capable of providing field service representation during construction.
   3. Metal plate panel rainscreen system installer must be an approved installer by the metal plate panel system fabricator for the installation of their metal plate panel system and have undergone proper training for the specified system.
C. Mock-Up
   1. At location on building and to extent directed by Architect, install areas of specified wall panels, support framing, flashing, trim and accessories to show:
      a. Substrate preparation
      b. Support framing, furring, and flashing
      c. Clearances and gaps between members
      d. Fastening methods
      e. Trim details
      f. Joint protection
      g. Workmanship
   2. Prepare mock-up for Architect's approval before start of wall panel work. Prepare additional mock-ups, if required by Architect, until approved.
   3. Maintain approved mock-up during construction to establish required standard of workmanship and basis of comparison for installation of wall panel work. Approved mock-up may remain as part of finished work.
   4. For custom colors, primer coated metal plate wall panels may be provided for application of a representative spray-coat match to the specified coil coated finish, for evaluation of color appearance only. Color match approvals must be made with paint vendor draw-down matches as described in section 1.04:D:2:b
D. Installation Documents On-Site
   1. Maintain copies of installation instructions, approved submittals and other execution related documents on-site; make available as need to confirm proper installation.
E. [____]

1.06 DELIVERY, STORAGE & HANDLING

A. Adhere to manufacturer's ordering instructions and lead time requirements to avoid delays.
B. Deliver materials to fabricator in manufacturer's original, unopened, undamaged containers with identification labels intact.
C. Protect finish of panels by applying heavy-duty removable plastic film during production.
D. After fabrication, package composite wall panels for protection against transportation damage.
E. Store material in accordance with manufacturer's guidelines.
   1. Exercise care unloading, storing and installing panels to prevent bending, warping, twisting and surface damage to the factory applied finish.
   2. Store materials protected from exposure to harmful weather conditions.
   3. Protect panels from moisture and condensation with tarpaulins or other suitable weather tight covering installed to provide ventilation.
   4. Slope panels to ensure positive drainage of any accumulated water.
   5. Avoid contact with any other materials that might cause staining, denting or other surface damage to the factory applied finish.

1.07 WARRANTY

A. Manufacturer's Warranties: Submit, for Owner's acceptance, manufacturer's standard warranty document executed by authorized company official. Manufacturer's warranty is in addition to, and not a limitation of, other rights Owner may have under the Contract Documents.

B. Warranty Periods:

1. Panel Integrity: 5 Years commencing on Date of Substantial Completion.
2. Painted Finish: 20 Years commencing on Date of Substantial Completion.
3. Anodized Finish: 5 Years commencing on Date of Substantial Completion.

PART 2: PRODUCTS

2.01 METAL PLATE WALL PANELS

A. Solid Aluminum Plate Wall Panel Provider

1. Alfrex, Inc. 943 Gainesville Hwy. Bldg 100-4000, Buford, GA 30518
   Phone - (470) 589-7449
   Website - http://alfrexusa.com
   Email - alfrex@alfrexusa.com

2.02 BASIS OF DESIGN

A. Alfrex Plate - non-combustible solid aluminum plate wall panels

B. Description: 100% Solid Aluminum Plate Panels used for exterior wall cladding, parapets, fascia and soffits as the siding component of a rainscreen system that also includes a ventilated drainage plane and a vapor-permeable air barrier provided under separate sections and trade contracts.

C. Thickness:

1. 3mm (0.125in nominal)
2. 2.5mm (0.100in nominal)
3. 2mm (0.080in nominal)
4. 1.5mm (0.063in nominal)

D. Aluminum Alloy: 3003-H14

E. Alfrex Plate Weight:

1. 3mm: 1.66lb/ft^2 (8.10kg/m^2)
2. 2.5mm: 1.33lb/ft^2 (6.75kg/m^2)
3. 2mm: 1.11lb/ft^2 (5.40kg/m^2)
4. 1.5mm: 0.83lb/ft^2 (4.05kg/m^2)

F. Finishes

1. Coil coated KYNAR® 500 or HYLAR® 5000 based Polyvinylidene Fluoride (PVDF) or Fluoro Ethylene - Alkyl Vinyl Ether (FEVE) resin in conformance with the following general requirements of AAMA 2605.
   a. Color: (Select on of the following)
      1) Standard color as selected by the owner / architect / engineer from manufacturer's standard, color selection.
         a) 2 Coat Solid
         b) 2 Coat Mica
         c) 3 Coat Metallic
         d) [____]
      2) Custom color to be matched by the panel supplier
         a) 2 Coat Solid
         b) 2 Coat Mica
         c) 3 Coat Metallic

d) [____]

b. Dry Film Thickness:
   1) 2 Coat: 1.0mil (±0.2mil)
   2) 3 Coat: 1.0mil (±0.2mil) + 0.50mil (±0.05mil)
c. Hardness: ASTM D3383; HB minimum using Eagle Turquoise Pencil
d. Impact Resistance
   1) Test method: ASTM D2794; Gardner Variable Impact Tester with 5/8" mandrel
   2) Coating shall withstand reverse impact of 1.5in/lbs per mil substrate thickness
   3) Coating shall adhere tightly to metal when subjected to #600 Scotch Tape pick-off test. Slight minute cracking permissible. No removal of film to substrate.
e. Adhesion:
   1) Test Method: ASTM D3359: Coating shall not pick-off when subjected to an 11in x 11in x 1/16in grid and taped with #600 Scotch Tape.
f. Humidity Resistance:
   1) Test Method: ASTM D2247
   2) No formation of blisters when subject to condensing water fog at 100% relative humidity and 100°F for 4000 hours.
g. Salt Spray Resistance:
   1) Test Method: ASTM B117; Expose coating system to 4000 hours, using 5% NaCl solution.
   2) Corrosion creepage from scribe line: 1/16" max.
   3) Minimum blister rating of 8 within the test specimen field.
h. Weather Exposure:
   1) Outdoor:
      a) 10 Year exposure at 45° angle facing south Florida exposure.
      b) Maximum color change of 5 Delta E units as calculated in accordance with ASTM D2244
      c) Minimum chalk rating of 8 in accordance with ASTM D4214
      d) No checking, crazing, adhesion loss
i. Chemical Resistance:
   1) ASTM D1308 utilizing 10% Muriatic Acid for an exposure time of 15 minutes. No loss of film adhesion or visual change when viewed by the unaided eye.
   2) ASTM D1308 utilizing 20% Sulfuric Acid for an exposure time of 18 hours. No loss of film adhesion or visual change when viewed by they unaided eye.
   3) AAMA 2605 utilizing 70% reagent grade Nitric Acid vapor for an exposure time of 30 minutes. Maximum color change of 5 Delta E units as calculated in accordance with ASTM D2244.

2.03 ALTERNATES

A. Base Bid/Contract Manufacturer: [Specify base bid/contract manufacturer].
   1. Product: [Specify product base bid/contract brand/trade name with product attributes and characteristics].
B. Alternate No. [Specify #]: [Specify alternate manufacturer].
   1. Product: [Specify product alternate brand/trade name with product attributes and characteristics].
C. Alternate No. [Specify #]: [Specify alternate manufacturer].
   1. Product: [Specify product alternate brand/trade name with product attributes and characteristics].

2.04 PRODUCT PERFORMANCE

A. Production Tolerances:
   1. Width: ± 2.0mm
   2. Length: ± 2.0mm
   3. Thickness: ± 0.001in (0.1mm)
   4. Bow: Maximum 0.5% length or width

2.05 FABRICATION

A. General: Shop fabricate to sizes and joint configurations indicated on drawings.
   I. Fabricate panels too dimensions indicated on drawings.
   2. Formed metal plate panel lines, breaks and angles to be sharp and true, with surfaces that are free from warp or buckle.
B. Fabrication Tolerances: Shop-fabricate panels to sizes and joint configurations indicated on drawings.
   I. Width: ± 0.079in [± 2.0mm] @ 70°F (2I°C)
   2. Length: ± 0.079in [± 2.0mm] @ 70°F (2I°C)
   3. Squareness: ± 0.079in [± 2.0mm] @ 70°F (2I°C)

PART 3: EXECUTION

3.0I METAL PLANT FABRICATOR AND INSTALLER INSTRUCTIONS

A. Compliance: Comply with provide product data, including product technical bulletins, product catalog installation instructions and product carton instructions.

3.02 EXAMINATION AND PREPARATION

A. Verify that conditions of substrates previously installed under other sections or divisions are acceptable for metal plate panel rainscreen system installation. Documentation should be provided indicating any conditions detrimental to the performance or installation of the metal plate wall panel rainscreen system.
   I. Notify [Architect] of unacceptable conditions once discovered.
   2. Proceed with preparation and installation only after unacceptable conditions have been corrected.
B. Field Measurements
   I. If required per project conditions, field measurements of the site condition are to be taken prior to beginning fabrication work and notification of any material modifications and resulting schedule adjustment shall be formally documented.
   2. Field measurements are to be made once all substrate and adjacent materials are installed, verifying the locations of wall framing members and wall opening dimensions before commencement of installation. Indicate measurements on the “As Build Shop Drawings”.
C. Project Schedule: Provisions in the project schedule must accommodate the time interval between field measurements and fabrication/installation.
D. Miscellaneous Framing: Install miscellaneous rainscreen system support member and anchorage according to metal plate panel rainscreen system written instructions and drawings supplied by the metal plate panel rainscreen system Fabricator.

3.03 INSTALLATION

A. General:
   I. Install panels plumb, level and true in compliance with fabricator’s recommendations.
   2. Anchor panels securely in place in accordance with fabricator;s approved shop drawings.
   3. Comply with fabricator’s instructions for installation of concealed fasteners and with provisions of Section 07 90 00 for installation of joint sealers.
   4. Installation Tolerances: Maximum deviation from horizontal and vertical alignment of installed panels: 0.25in in 20ft (6.4mm in 6.Im), noncumulative.
   5. Separate contact of dissimilar metals with bituminous paint, approved plastic shims, or other approved methods as defined within the Aluminum Design Manual (ASD). Use gasketed or approved coated fasteners where needed to eliminate the possibility of corrosive of electrolytic action between metals.
B. Related Products
   I. General: Refer to other related sections in Related Sections paragraph specified herein for related materials, including cold-form metal framing, flashing and trim, joint sealants, aluminum windows, glass and glazing and curtain walls.

3.04 FIELD QUALITY REQUIREMENTS

A. Field Quality Control: Comply with panel system fabricator's recommendations and guidelines for field forming of panels.

B. Field Quality Control: When required by contract, mock-up shall be constructed and tested at the expense of the Architect/Owner/General Contractor.

C. Testing Agency: If required, the Owner shall engage a qualified testing agency top perform tests and inspections.

D. Fabricator's Field Services: Upon Owner's request, provide fabricator's field service consisting of product use recommendations and periodic site visit for inspection of product installation in accordance with fabricator's instructions.

3.05 ADJUSTING AND CLEANING

A. Adjusting

I. Remove and replace panels damaged beyond repair as a direct result of the panel installation. After installation, panel repair and replacement are the responsibility of the General Contractor.

2. Removal of panels damaged by other trades is the responsibility of the General Contractor.

3. Repair components of the metal plate panel rainscreen system that present with minor damage provided said repairs are not visibly apparent at a distance of l0ft (3m) from the surface at a 90° angle per AAMA 2605.

4. Remove and replace components of the metal plate panel rainscreen system damage beyond repair.

5. Remove protective film immediately after installation of metal plate panels and immediately prior to completion of the metal plate panel rainscreen system work. Protective film intentionally left in plate after panel installation on any elevation at the direction of the General Contractor, is the responsibility of the General Contractor.

6. Any additional protection, after installation, is the responsibility of the General Contractor.

7. Ensure weep holes and drainage channels are unobstructed and free of dirt and sealants.

8. Promptly remove from the job site any damaged metal plate panels, protective film, and other debris attributable to metal plate panel rainscreen system and installation, and legally dispose of said materials.

B. Cleaning

I. After metal plate panel rainscreen system installation remove temporary coverings and protection of adjacent work areas. Repair or replace damaged installed products. Clean installed products in accordance with manufacturer's instructions prior to owner's acceptance.

3.06 PROTECTION

A. Protect installed products from damage during subsequent construction work until final inspection and acceptance by Owner

B. [____]

END OF SECTION